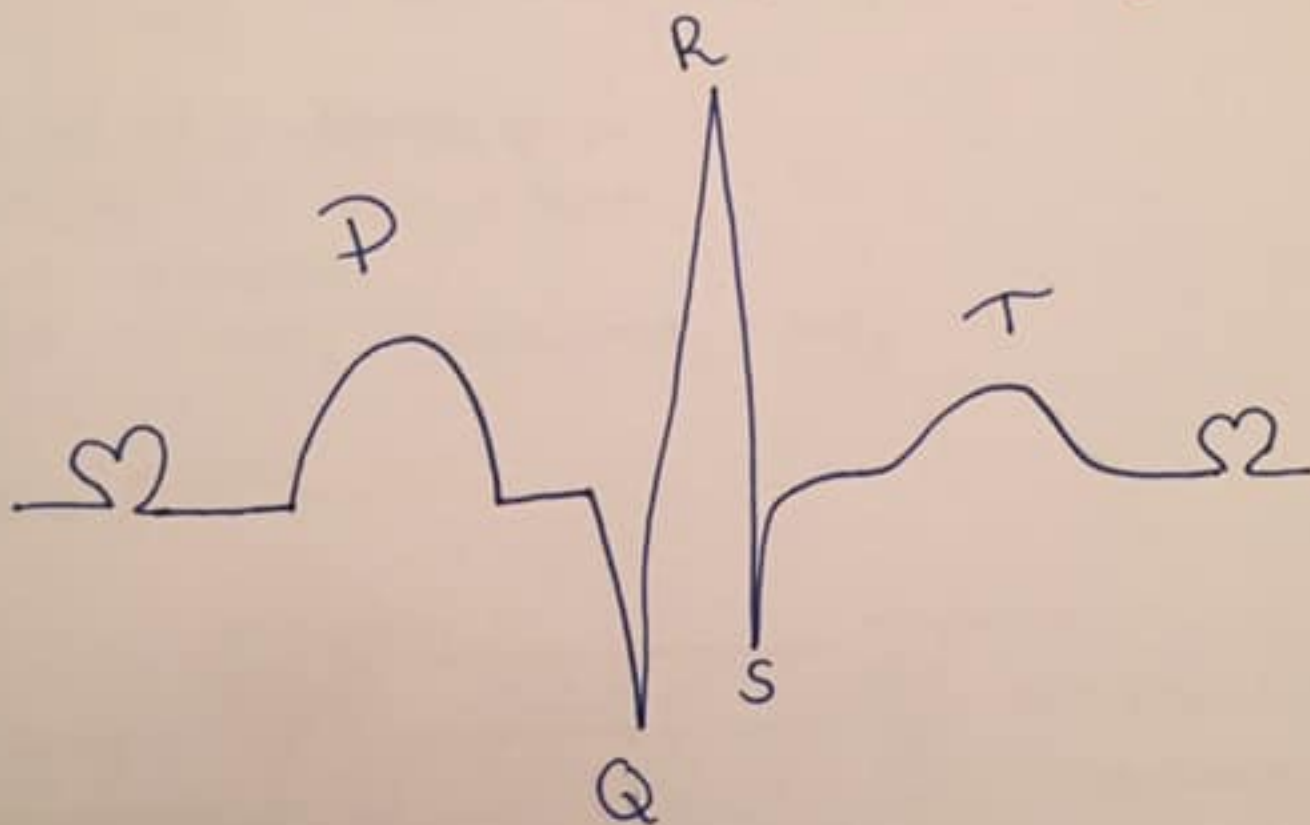


ECG

electro - cardio - gram



«تفريغ محاضرات الدكتور سيف

& الدكتور عبد الرؤوف»

♥ 2019

VISIT...

LANZAROTE
Caliente.COM

ECG

"electro-cardio-gram"

- Electrical activity of the heart represented graphically
- By ECG you can know 3 pathologies "Ischemia - enlargement - Arrhythmias" but normal ECG doesn't exclude any disease
- Any Pt with Chest pain "even peripheral" $\rightarrow$ 1st inv is ECG "Not X-ray"

Conductive System of the $\heartsuit$



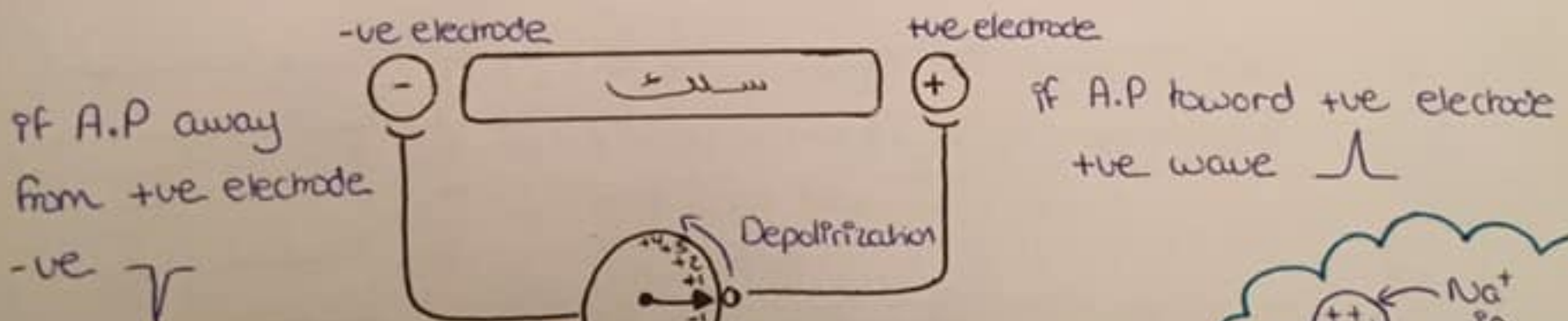
1. SAN "rate 60-100 beat/min"
2. AVN "rate 40-60 beat/min"
3. Purkinje system "rate 30-40 beat/min"

if SAN diseased $\rightarrow$ AVN rhythm & if AVN diseased $\rightarrow$ $\heartsuit$ Block

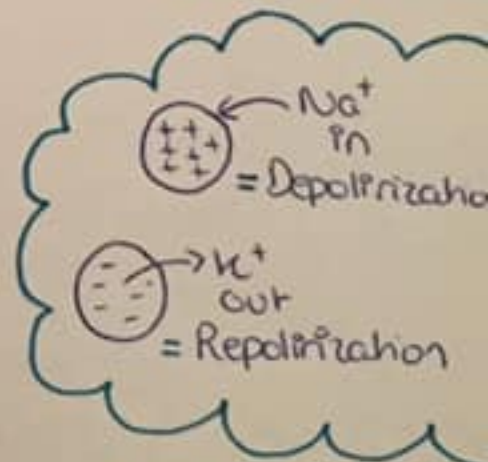
Shape of ECG depends on &

1. Direction " +ve / -ve " $\rightarrow$ vectors
2. Power $\rightarrow$ Amplitude
3. Speed $\rightarrow$ Velocity "Arrhythmia brady or tachy"

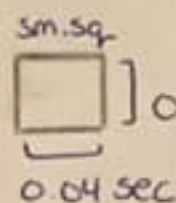
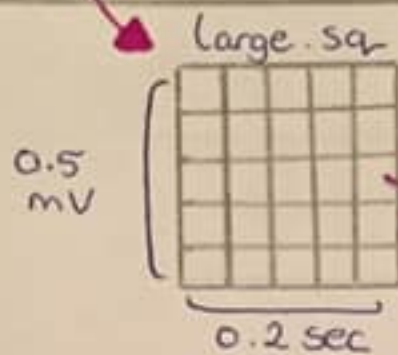
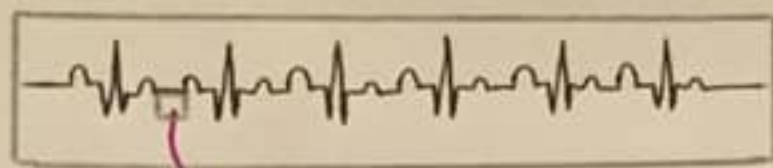
Principle of ECG



read electricity of $\heartsuit$ & draw it on a paper at a speed 25mm/sec



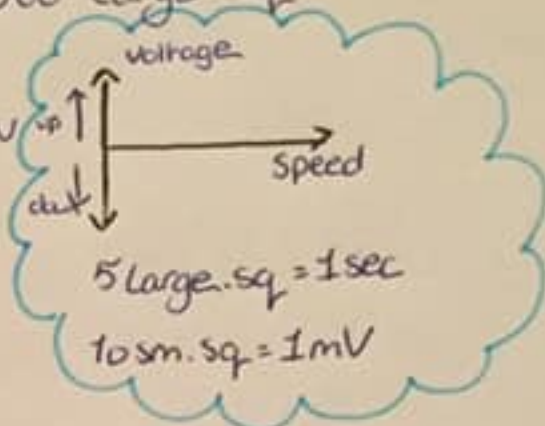
ECG Paper



$$25 \text{ mm/sec} \times 60 = 1 \text{ min}$$

$$= 1500 \text{ sm.sq}$$

$$= 300 \text{ Large.sq}$$

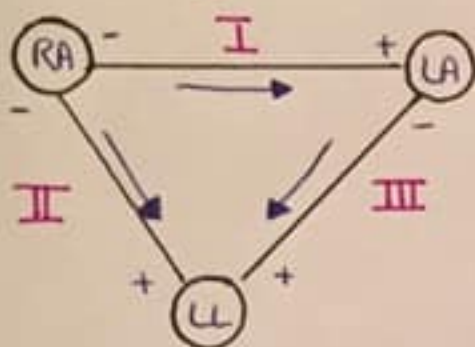


LEADS

read electricity btw 2 different points on the body.

12 Leads "6 Limb leads + 6 Chest leads"

Limb Leads



Standard Limb leads



Augmented Limb leads

- RL $\rightarrow$ Not imp "connected to earth" $\Rightarrow$ if Pt Dextrocardia RL instead of LL
- Leads on wrist "Not deltoid" & feet "Not thigh" b/c fat lead to low voltage electricity & Sk.ms misread it's activity instead of the cardiac ms

Chest Leads



V_1 = Rt sternal margin "4th intercostal space"

V_2 = LF sternal margin "4th intercostal space"

V_3 = mid way btw $V_2 + V_4$

V_4 = Apex beat

V_5 = LF ant axillary line "5th intercostal space"

V_6 = LF mid axillary line "5th intercostal space"

Note

V_7 = Post axillary line
 V_8 = Lat scapular
 V_9 = mid scapular line

} for Post Surface "Not Standard"

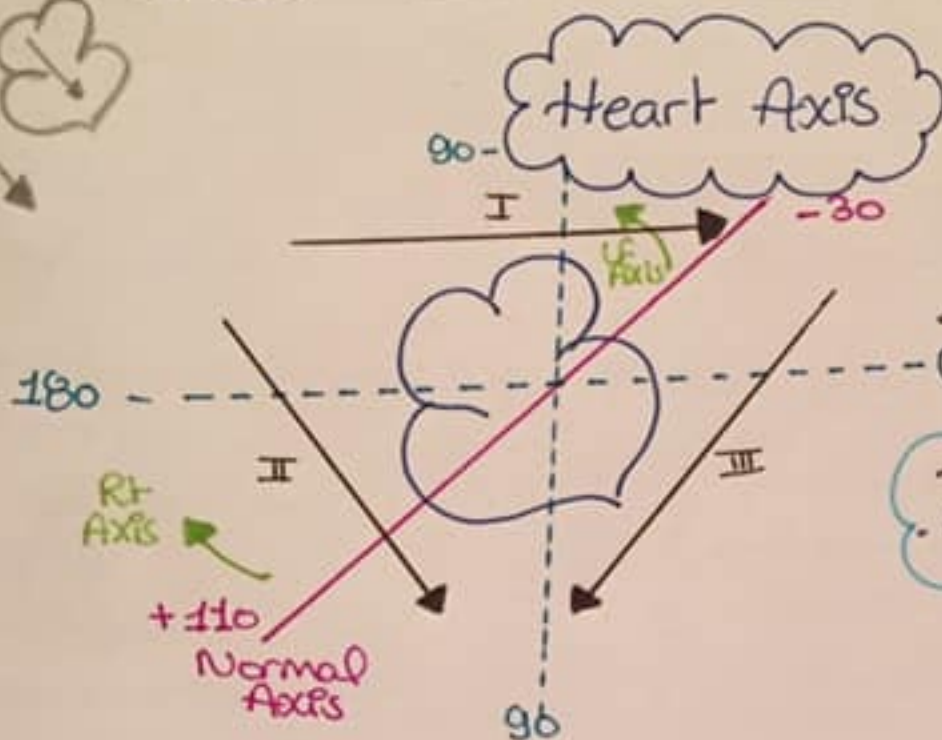
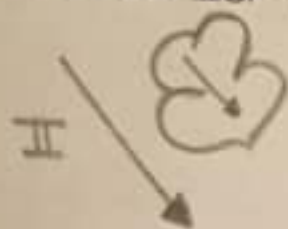
$V_1 + V_2 + aVR = \text{Rt side}$
 $V_5 + V_6 + aVL + I = \text{Lf side}$
 $II + III + aVF = \text{Inf}$
 $V_1 \rightarrow V_4 = \text{Ant}$

Lat = I / aVL / V₅ / V₆
 Inf = II / III / aVF
 Ant = V₁ / V₂ / V₃ / V₄

Lead II going with Cardiac axis so 1st to read.

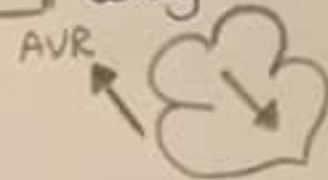
I	AVR	V ₁	V ₄
II	AVL	V ₂	V ₅
III	AVF	V ₃	V ₆

AVR "Not imp"
 always -ve b/c depolarization of $\heartsuit$ away from it, so if +ve ECG put on wrong or Pt Dextro $\heartsuit$



Normal Axis of $\heartsuit$ btw -30 & +110

- if $> +110$ = Rt Axis deviation
- if < -30 = Lt Axis deviation



* Rt Axis deviation *



I $\rightarrow$ $\sim$ $\heartsuit$ electricity away from lead I so -ve

III $\rightarrow$ $\sim$ $\heartsuit$ electricity toward lead III so +ve

OR

Rt = engaged σ

I $\rightarrow$ $\sim$ Looking at each other $\sim$

III $\rightarrow$ $\sim$ No need to see lead II "No Children yet :p"

Causes

- 1 = Young children - thin tall adults "b/c Diaphragm down"
- 2 = RVH + RBBB
- 3 = Lt Post hemiblock
- 4 = Anterolateral MI
- 5 = Pulm embolism

if lead I + II are +ve $\sim$ it's Normal Axis

LF Axis deviation



I → Λ ♥ electricity toward lead I so +ve
 II → ∇ ♥ electricity away from lead II + III
 III
 so -ve
 OR

LF = married ♂

I Λ
 III ∇

looking away than each other متفارقين :-
 You must see lead II "there son ♂"

↓

if -ve ∇ looking back → LF axis
 but if +ve Λ it's normal axis

Causes

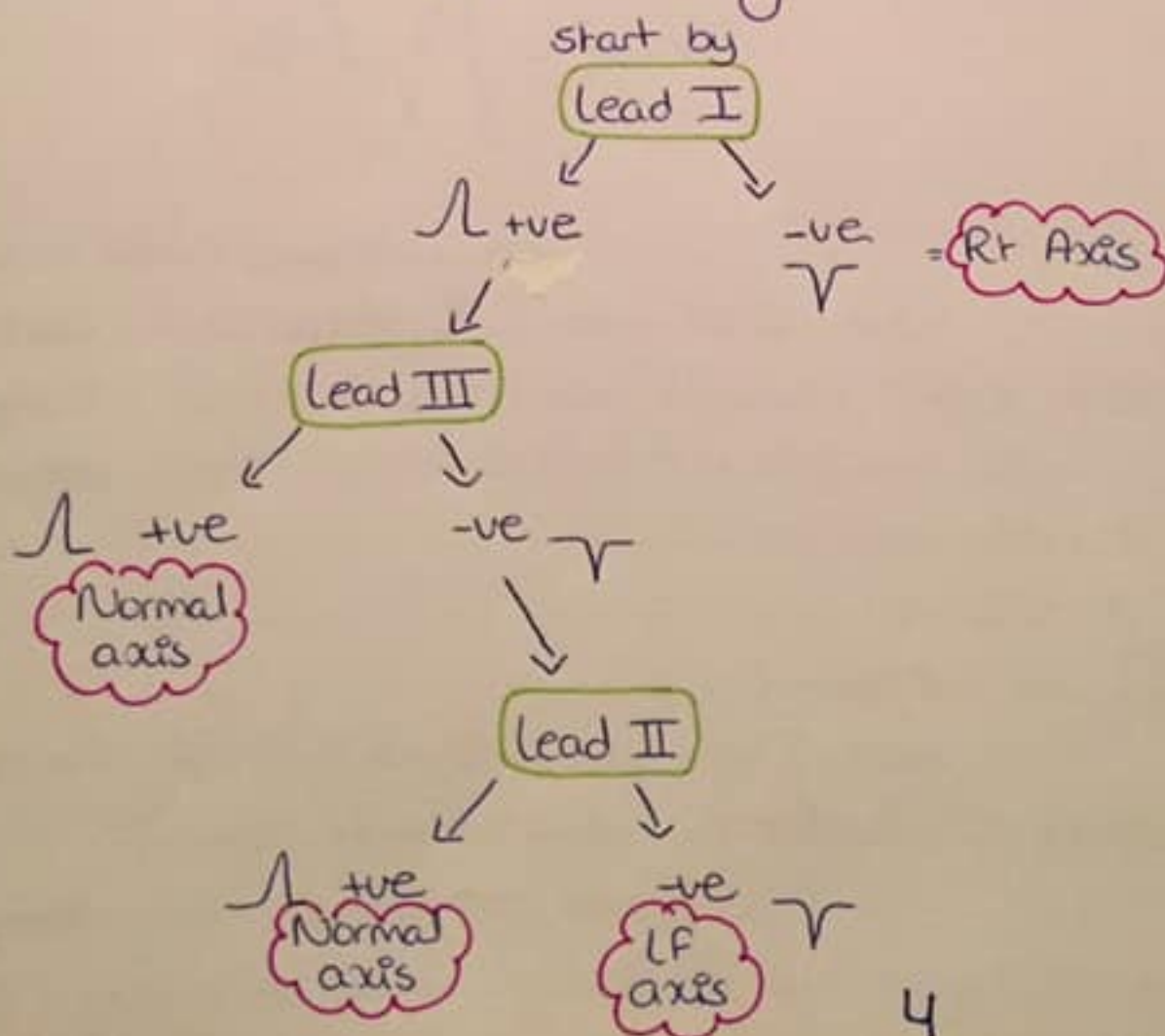
- 1 = Obesity + Short people + Any Abdominal distention → Diaphragm up
- 2 = LBBB
- 3 = LF ant hemiblock
- 4 = Inf MI
- 5 = emphysema
- 6 = hypokalemia < 3.5

if at lead III you can't see
 dominant wave up or down
 → then see **AVF** as an alternative

I Λ = LF & No need to see
 AVF ∇ lead II

"Not all LVH cause LF axis deviation"

* "Other way" *



Heart rate ♥

* if regular "R-R interval equal"

$$HR = \frac{\text{num of large sq b/w R-R}}{300}$$

or

$$= \frac{\text{num of sm. sq b/w R-R}}{1500}$$

(normally 3-5 large sq b/w RR)
or 15-25 sm sq

* if irregular "R-R interval not equal"

$$HR = \text{num of R waves in 15 large sq} \times 20$$

why 20? b/c 15 large sq = 3 sec

$$3 \text{ sec} \times 20 = 60 \text{ sec} = 1 \text{ min}$$

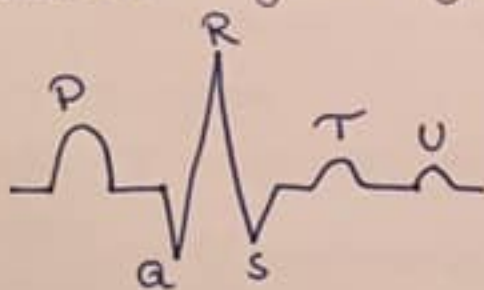
if ECG paper shorter than 15 large sq "ex: only 12 sq"

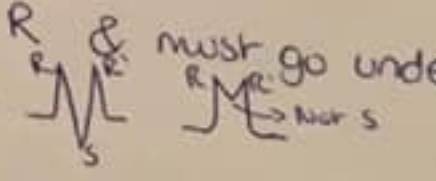
$$HR = \text{num of R waves in 10 large sq} \times 30$$

$$10 \text{ large sq} = 2 \text{ sec} \times 30 = 60 \text{ sec} = 1 \text{ min}$$

Note

irregular HR could be → regular irregular or irregular irregular



- P wave = Atrial Depolarization
- P-R interval = from beginning of P wave to Q wave
- P-R segment = iso-electrical line b/w 2 waves "P & Q" → AVN Delay
- QRS complex = vent Depolarization → R = any +ve wave
Q = any -ve before R
S = any -ve after R & must go under iso-electrical line

- Q-T interval = from beginning of Q wave to T wave
represent complete cycle = depolarization & repolarization of vent
- S-T segment = iso-electrical line b/w S & T
- T-wave = vent repolarization "variable not fixed - usually wider than P wave"
- U-wave = Papillary ms cont to open valves

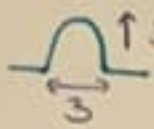
What is 300?

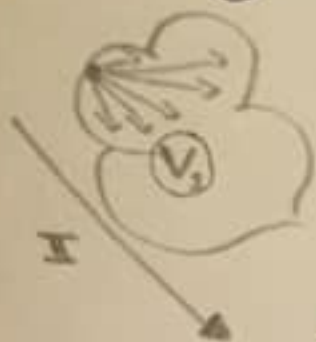
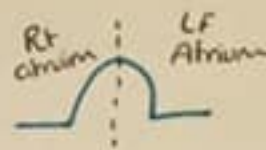
num of large sq in
1 min at speed 25mm/sec

What is 1500?

num of small sq in
1 min at speed 25mm/sec

P wave

Normally 3x3 , represents both atrium



Best read on lead II & V_1

Lead II +ve  b/c toward lead II "same direction"

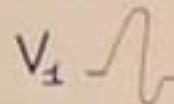
V_1 Biphasic  b/c Rt atrium toward V_1 but Lt atrium away from it

Note

If P wave presented normally followed by narrow QRS it's sinus rhythm

If Absent normal P wave = A sinus = ectopic focus = escape rhythm

Abnormalities of P wave 80

1 = P-pulmonale V_1 , lead II  tall P wave

Indicates Rt atrium enlargement

DD: Tricuspid stenosis $\rightarrow$ Rt atrium enlargement only

Pulmonary stenosis $\rightarrow$ [with Rt ventricular hypertrophy

Pulmonary HTN $\rightarrow$ [

"Note: It's called Pulmonale b/c MCC is Pulmonary HTN"

2 = P-mitral  (Bifid shape - notched - Bizarre - M shaped)

Indicates Lt atrium enlargement

DD: mitral stenosis $\rightarrow$ Lt atrium enlargement only

Aortic stenosis] with Lt ventricular hypertrophy

Systemic HTN]

"Note: It's called mitral b/c MCC is mitral stenosis"

3 = Inverted P wave "-ve" 



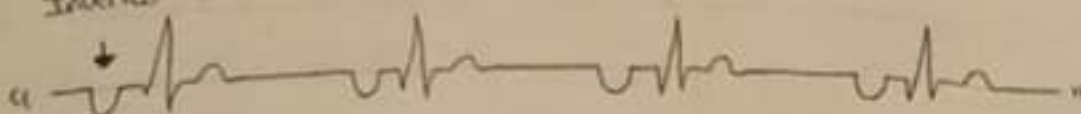
Junctional Arrhythmia "ectopic from the base of the atrium"

Lead II -ve wave  b/c it's in the opposite direction "away"

but in AVR it's +ve b/c it's toward it

Not Tx by Ablation b/c near to AVN $\rightarrow$ Complete $\heartsuit$ Block

Inverted P wave



Note

to diff b/w the P wave & the T wave

Start reading your ECG from the QRS complex $\rightarrow$ 1st wave

after it is the T wave & then comes the

P wave :D

4 = Atrial Flutter

Single ectopic with a rate more than SAN "ex: 250 beat/min"
but b/c of **AUN** protection Not all beats go down to the ventricle so HR could be normal & is Dx accidentally → needs Tx by AUN will shut down with time :: Weigle

Its called (Saw toothed Appearance)

regular R-R / narrow QRS b/c vent normal / Twave absent b/c of multiple P waves

4:1 → $\frac{300}{4} = \text{HR} = 75$

the 4th atrial contraction is hidden behind QRS

3:1 → $\frac{300}{3} = \text{HR} = 100$

2:1 → $\frac{300}{2} = \text{HR} = 150$ → Pt symptomatic

Never occur
in normal

mis Dx for sinus tachycardia → How can you diff?

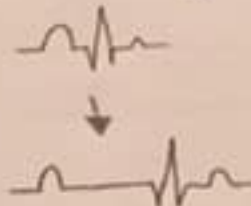
by prolongation of P-R interval by ↓ conduction of AUN by vagus stim "vagal
gag reflex - etc" or by Adenosine

Atrial Flutter

Sinus Tachycardia



prolongation



(Tx) by medication "B-Blocker - CCB - Digoxin" or Ablation b/c single ectopic

At the end it will return sinus "SAN dominant" or will go to Atrial Fibrillation

5 = Atrial Fibrillation

Absent P wave
replaced by F-waves "multiple ectopics"
R-R irregular / narrow QRS b/c vent normal
Pulse = irregular irregular

(Tx) only by medication & Anti-Coagulant

♡ Ablation is Not Tx of choice b/c multiple ectopics - قلة بصرى

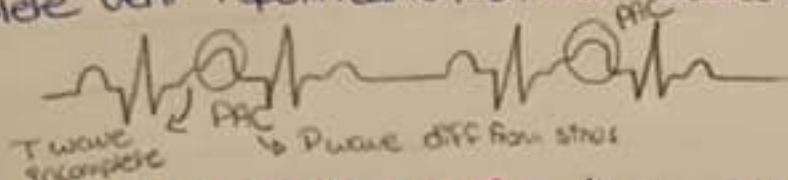
3 Things disappear
in A. Fib

A wave in Jugular vein
S4 in mitral stenosis
P wave in ECG

Can occur in
normal

6 = Premature atrial Contraction PAC

incomplete vent repolarization → Atrial started depolarization before vent finishes contraction

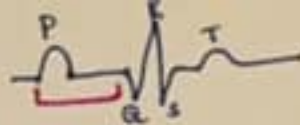


• Freq Asinus

7 = Multiple Atrial tachycardia "MCC COPD - emphysema"

Chronic hypoxemia → ectopic from atrium → then return sinus → other ectopic from atrium
then back to sinus "multiple pacemaker = different shapes for P wave"
= wandering Pacemaker

P-R interval



from beginning of P-wave to beginning of QRS
 effected directly by AVN, best seen in Lead II & V₁
 normally 3-5 sm.sq = 0.12sec - 0.2 sec

Short "pre-excitation"
 $< 3 \text{ sm.sq}$

- 1 = WPW syndrome
- 2 = AV Nodal re-entrant tachy
- 3 = LGL Syndrome

Prolonged "Delay"
 $> 5 \text{ sm.sq}$



Short P-R interval

Wolf - Parkinson white syndrome WPW

accessory pathway btw Atrium & vent "Bundle of Kent"

2 types

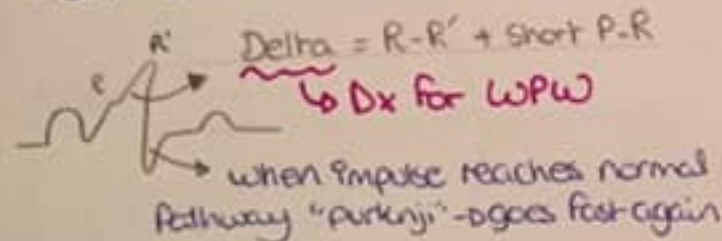
Antidromic
 "Antegrade"

Orthodromic
 "Retrograde"



Impulse go down by bundle
 "No AVN = No Delay
 b/c abnormal site in
 vent - impulse go slower

than normal $\rightarrow$ Delta wave



Impulse go through normal pathway
 SAN $\rightarrow$ AVN $\rightarrow$ bundle of His $\rightarrow$ vent
 then through accessory pathway $\rightarrow$
 up to atrium "retro-grade" re-entry cycle
 also called A-V Nodal re-entrant
 tachycardia

WPW C/I
 to use CCB
 & Digoxin

Lown Ganonglevine syndrome LGL

accessory pathway is in the bundle of His $\rightarrow$ tachycardia with narrow QRS
 b/c in the Normal pathway "Short P-R & No Delta = LGL"

Note if Pt (Atrial Fib + bundle of Kent) $\rightarrow$ No AVN protection
 all beats go down by accessory bundle $\rightarrow$ vent Fib
 so WPW + A. Fib = emergency "Ablation therapy for bundle of Kent."

Prolonged P-R interval "♥ Block"

1 = 1st Degree ♥ Block

Prolonged + Fixed + No Dropped QRS
"Every P wave followed by QRS"



if Dropped QRS exclude 1st Degree

2 = 2nd Degree ♥ Block
Mobitz 1 &

AUN Delay more than 1st degree

Vent give ectopic from proximal thick part of bundle of His "electro-physiological stable"

So give impulse without stopping with narrow QRS

Progressive prolongation of P-R → then Dropped QRS → then back to normal & Cycle is repeated, Difficult to Dx by short ECG "need long to see 'Wendtchach phenomenon'"

if short ECG paper "narrow QRS + Dropped beat"

Mobitz 2 &

AUN & Proximal part of bundle stopped → Distal & Purkinji are the pacemaker but they distribute slowly "wide QRS, electro-physiological unstable → ♥ arrest at any time"



Constant P-R interval - Dropped QRS - irregular R-R

3 = 3rd Degree ♥ Block "Complete"

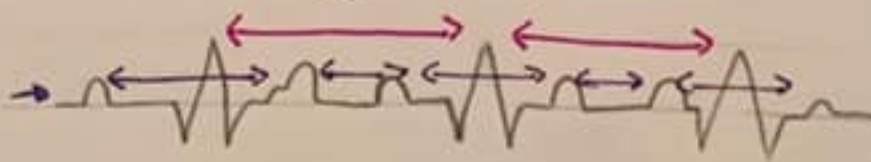
No impulse from atrium goes down to vent "A-U dissociation"

(Atrium contract with rate 70 beat "SAN") →

(Vent contract with rate 25-40 beat from Distal end of Purkinji fibers) →

b/c severe bradycardia ↓ COP → recurrent syncope Adam's stroke attack

(Together on ECG paper) →



(P-P constant)
(R-R constant)

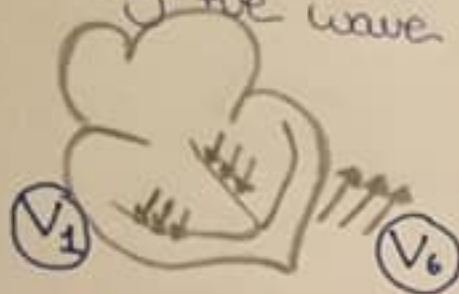
if Atrium contracts at same time of vent - vent will exceed atrium & close M + T valves → ↓ COP suddenly

Atrium contract against closed valves "Canon A wave in JVP"

So 3rd Degree = A-U Dissociation - Severe bradycardia
P-P constant - R-R constant

QRS

Base 3sm. sq normally
any +ve wave = R

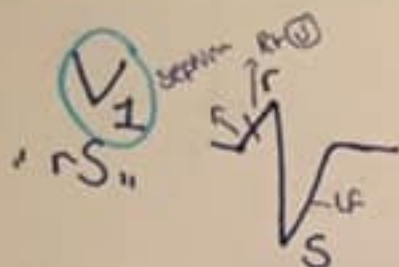


any -ve "Q before R" "S After R"
why 3 waves?

b/c vent depolarization at 3 stages

1st septum - then Rt vent - Last Lf vent

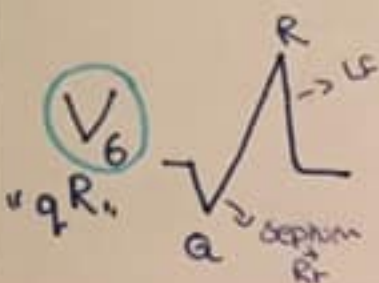
- Septum takes impulse from Lf bundle "never from Rt" $\swarrow \swarrow$
- Rt vent takes from sub-endothelium to ms layer $\swarrow \swarrow$
- Lf vent "more thicker" from Rt to Lf $\nearrow \nearrow$



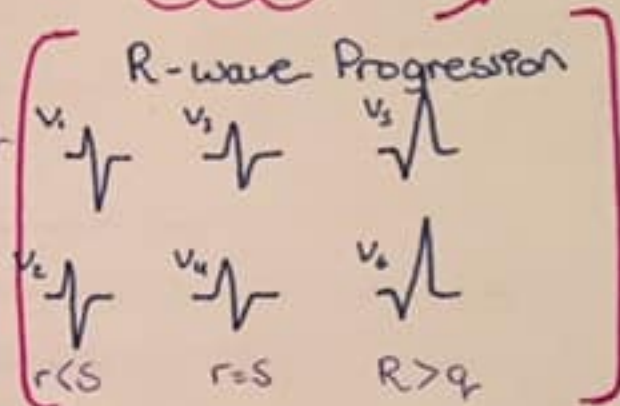
r wave $\rightarrow$ from septum & Rt vent
+ve b/c toward U_1
S wave $\rightarrow$ Lf vent
-ve b/c away from U_1

r smaller b/c
weaker than
Lf vent

IF poor
sign of MI



Q wave $\rightarrow$ from septum & Rt vent
-ve b/c away from U_6
R wave $\rightarrow$ Lf vent
+ve b/c toward U_6



Vent Hypertrophy

RVH
(V_1 / U_2) $\leftarrow$ R wave $\rightarrow$ (V_5 / U_6)
> 5mm
1 large sq

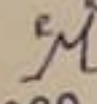
LVH
(V_5 / U_6)
> 25mm
5 large sq

or
S in V_1 or U_2
R in U_5 or U_6
= $> 35mm$
 $\Downarrow$

Note

- V_1 more accurate for R wave than U_2
So IF NOT tall in U_1 there's NO RVH
- V_5 more accurate for R wave than U_6 "LVH"
b/c U_6 thickness of the lung isolate.
- Don't count R wave in case of BBB or ectopic Beat.

"Voltage Criteria"
more accurate esp IF Pt HOCM
ms thickness Not equal

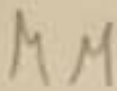
BBB 
RBBB

- MI - cardiomyopathy
- myocarditis
- Pulm HTN "Cor-pulmonale"
- Pulm stenosis

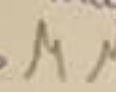
(Any cause $\uparrow$ pressure on wall
 $\uparrow$ pressure on conductive system)

- LBAB**
MI - cardiomyopathy
- myocarditis
- Systemic HTN
- Aortic stenosis

BBB $\rightarrow$ R-R' "m-shaped - notched - Bizard"
Not Delta b/c normal P-R interval
must be in 2 leads or more "if one could be machine problem"

RBBB $\rightarrow$  at $V_1 - V_2$ "V₅ & V₆ normal"

may be normal so doesn't indicate severity

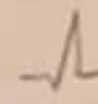
LBBB $\rightarrow$  at $V_5 - V_6$

"if newly dx deal as MI b/c could present as BBB Not STEMI"

Note

if m-shaped 1st see V_1 $\rightarrow$ if +ve  its RBBB
 $\rightarrow$ if -ve  its LBBB

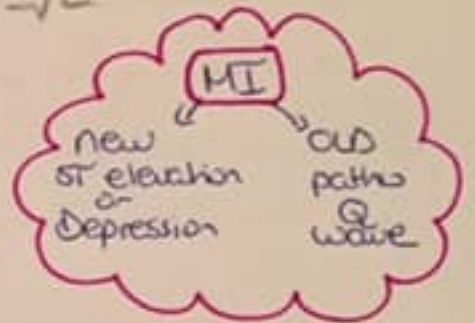
Q wave

normal base $< 1 \text{ sm.sq}$ & Depth $< 1/3$ R wave 

Pathological if $> 1 \text{ sm.sq}$ or $> 1/3$ R

& indicate CLD MI "even if in one lead"

or HOCM "V₅ - V₆"



Note

Sum of R wave in lead I + II + III = 15 mm

if less than 15 mm = Low voltage ECG "see if well calibrated or not"

DDs: edema "peripheral - pericardial effusion - pleural effusion"

• megaly in chest "emphysema" - lymphoma - mass

• Obesity

• hypothyroidism - hypothermia $< 35^\circ\text{C}$

NOT $\downarrow \text{K}^+$
or electrolyte disturbance

Tx $\uparrow$ sensitivity "Calibration of ECG"

ex: $10 \text{ sm.sq} = 1 \text{ mV} \rightarrow$ Change to 20 sm.sq for proper visualization
 $\rightarrow$ R wave normally 5 mm $\rightarrow$ up to 10 mm is normal

Block

• BP-Fascicular = AUN Block + BBB

Tri-Fascicular = AUN Block + RBBB + Post Block of LF bundle

$\rightarrow$ Tx Dual Chamber Pacemaker

"wide QRS"

- BBB

- vent extrasystole

- vent tachycardia

- vent Pb

- vent pacemaker

- WPW syndrome

Ventricular ectopic

wide QRS - No P wave before it - Complex inversely to T wave
 Can occur in normal heart due to coffee & ↓ sleep
 Dx by Holter ECG "so normal ECG doesn't exclude VEB"

• If Complex of ectopic same shape = same "one ectopic" = uniform
 Tx by Ablation

• If Complex of ectopic different shapes = multiple ectopics = multiform = polymorphic
 more Dangerous → could go to vent. fibr

All types of tachy arrhythmia are Tx by Amiodarone except VEB its C/I

Types of VEB

1 = Bigeminy = every 2nd beat is an ectopic beat "50%"
 more Dangerous, risk for V-tachy



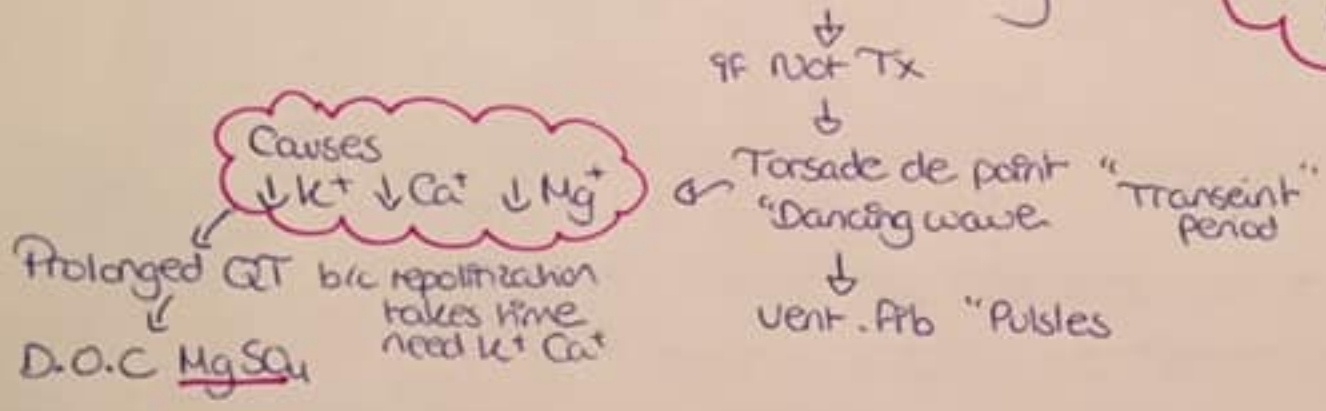
2 = Trigeminy = every 3rd beat is an ectopic beat

3 = Quadrigeminy = every 4th beat is an ectopic beat

NOTE

- if one ectopic beat = simple ectopic
- if 2 after each other = Coupled beat
- if 3 consecutive beats = vent. Tachy

V-Tachy
 MCC of Death in
 MI "1st 24 hr"
 HF & HOCM



DD of V-Tachy = Combined Arrhythmia "SVT + BBB"

How to Diff? (by strip ECG)

b/c V-Tachy is an ectopic, in 20 min SAN will be pacemaker & represent that as "Capture beat" → Complete beat btw ectopics
 or "Fusion beat" → No T wave so not complete beat.
 ectopic will stop firing in 20 mins and SAN will work
 but in SVT with BBB No ectopic → so even after 20 min there will not be Capture or Fusion beat

OR by medication "Adenosine" → if improved it's SVT, if NOT it's V-tachy

Features going with V-tachy more than SVT + BBB *

- | | | |
|------------------------------|---------------------|--|
| 1) Hx of MI | 2) A-U dissociation | 3) Capture beat & Fusion beat |
| 4) extreme LF Axis Deviation | 5) very broad QRS | 6) No response to Cardiac massage or I.V Adenosine |

ST segment

Normal upto 1mm up or down in Limb leads & 2mm in chest leads

ST elevation

- STEMI
- Prinzmetal angina
- Pericarditis "diffuse"
- LV aneurysm
- LBBB
- Cocaine abuse
- Subarachnoid Hge.

ST Depression

- NSTEMI
- Angina "stable & unstable"
- Digitals "Therapeutic dose" (down sloping)
- Vent strain "Hypertrophy + ischemia"
- Hypokalemia
- myocarditis

- (↓ K⁺)
- LF Axis deviation
 - Prolonged QT interval
 - ST Depression
 - Inverted T wave
 - U wave

MI → ST elevation in

- V₁ → V₄ = Ant
 - V₅ + V₆ = Lat
 - I + AVL = Lat
 - II + III + AVF = Inf
- U₁ → V₆ = Ant + Lat extensive

Case ⇒ ST elevation from V₁ to V₆ = Acute extensive Ant-lat MI

How to exclude other DD?

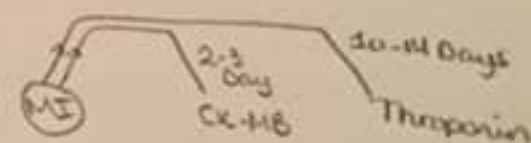
- 1 = Pericarditis → Diffuse Not Localized "except AVR + V₁"
 - ↳ enz could be Normal
 - ↳ Hx of Stopping Chest pain "longer duration"

✓ concave shape smile ~
 ↓
 MI convex
 ☹

- 2 = Prinzmetal angina → enz -ve

- 3 = aneurysm → Post MI "at 4th Day ECG unchanged from previous"
 - ↳ could be recurrent MI "silent b/c analgesia"
 - or aneurysm

Diff by enz "CK-MB"



MI

1st change Tented T wave

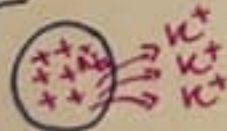
Acute MI ST elevation T wave down "48-36hr"

recent MI Deep Patho Q wave inverted T wave 3 months

Old MI patho Q wave

- 4 = Subarachnoid Hge → Hx of HTN & neck stiffness

NOTE S-T segment btw Depolarization of cell & repolarization where + equal - → iso-electrical line



NOTE

ST elevation + 1st Degree $\heartsuit$ Block
Inf leads

why?

b/c inf MI $\rightarrow$ irritation of Diaphragm $\rightarrow$ vagus stim $\rightarrow$ AVN Delay "transient"
need temporary pacemaker

Inf MI $\rightarrow$ Rt marginal artery occlusion $\rightarrow$ so Rt vent effected $\rightarrow$ must assess completely by putting leads from LF to Rt "as if Pt has dextrocardia"

Reciprocal Changes of ST-segment "Confirm MI"

ex: ST elevation in Lead II-III-AVF $\rightarrow$ Inf MI with ST depression in $V_1 - V_4$
"Ant ischemia"

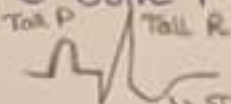
why? Blood shifting $\rightarrow$ on ant as a compensatory mechanism
So you say "ST elevation in Inf leads ass with reciprocal changes in Ant leads"

or "ST elevation in Ant leads ass with reciprocal changes in Inf leads"

Note

ST-Depression + Hypertrophy $\Rightarrow$ Strain

b/c ms bulk $\uparrow \rightarrow$ $\uparrow$ demand "relative ischemia"

ex: $V_1 =$  $\rightarrow$ ST Depression

b/c ass with P-Pulmonal $\rightarrow$ cause Pulm HTN

T wave



vent repolarization " K^+ efflux"

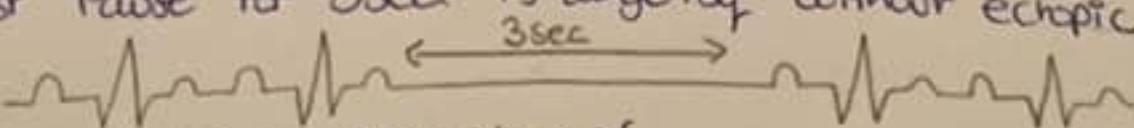
normally less than 10mm.sq, if $>$ = Tented T-wave

ⓓ of Tented T wave $\rightarrow$ $\uparrow K^+$ "diffused"

• early change of MI "localized in specific leads"
"15-20min"

Inverted T wave $\rightarrow$ same cause of ST Depression
+ $\downarrow Mg^+$ + $\downarrow Ca^+$

NOTE Sick sinus syndrome

- $\downarrow$ Automaticity of SAN "ex: 40 beat Not 60-100" due to degeneration process by ageing $\rightarrow$ b/c bradycardia $\downarrow$ COP to brain $\rightarrow$ Adam Stokes Syndrome
 - sinus arrest "Pause" for 3sec "15 large.sq" without ectopic then return regular 
- Need pacemaker b/c may not return :(

SAN Block $\rightarrow$ Not 3sec pause

Pacemakers

-  spike before P wave $\rightarrow$ pacemaker in atrium
-  spike before QRS $\rightarrow$ pacemaker in vent "wide QRS b/c Not from bundle"
- Dual Pacemaker if before atrium & vent

Torsade de point "Polymorphic V-tachy"

Absent P-wave - wide QRS - regular R-R - Prolonged Q-T

Causes $\rightarrow$ Bradycardia

- electrolyte disturbance " $\downarrow K^+$ $\downarrow Ca^{++}$ $\downarrow Mg$ "
- Drugs $\rightarrow$ erythromycin - TCA - Anti-arrhythmic etc
- Congenital defect

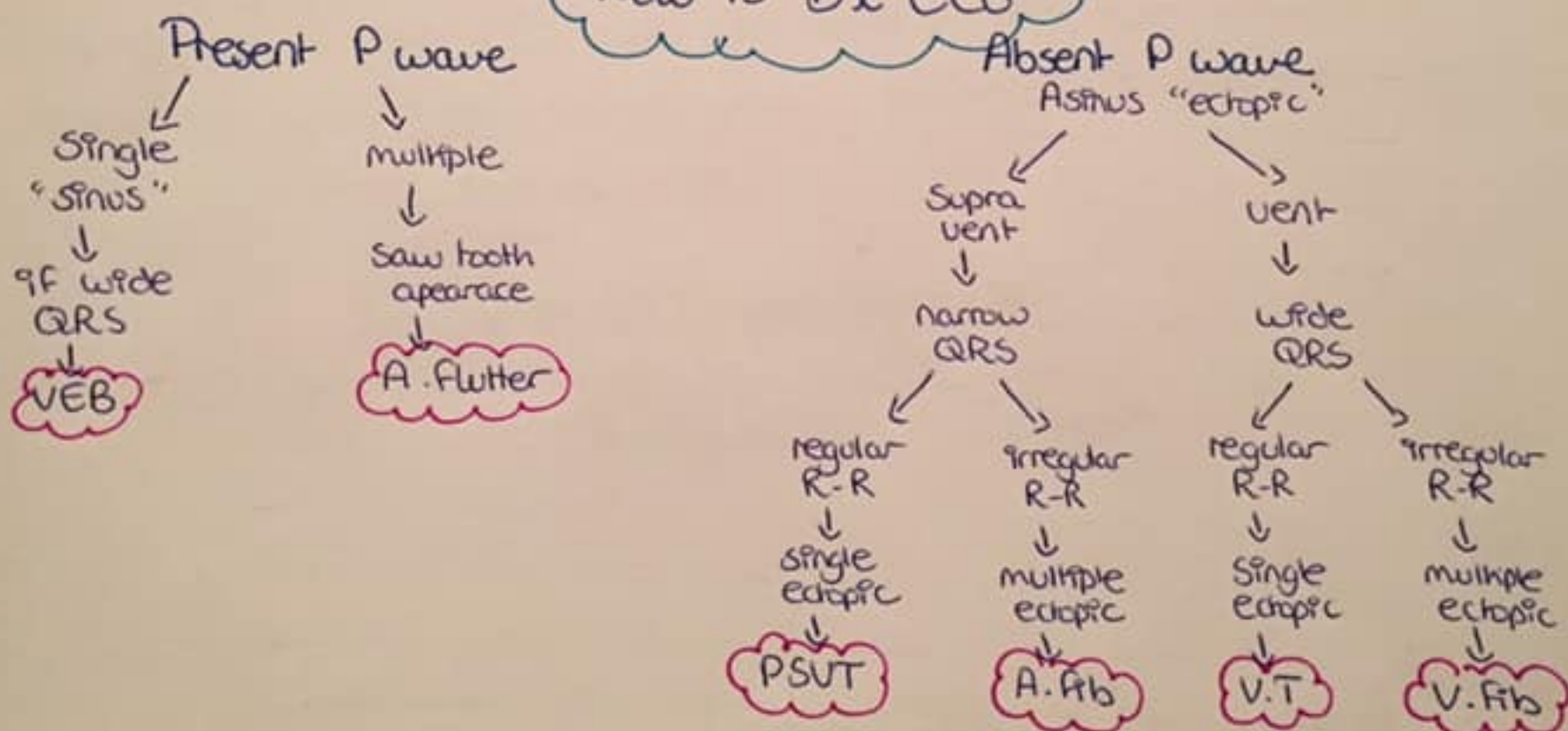
Tx: Mg SO₄ I.V

Vent. Fib At Collapsed $\rightarrow$ No COP

Absent P-wave - wide QRS - irregular R-R

Tx: as $\heartsuit$ arrest "CPR & D.C shock"

How to Dx ECG





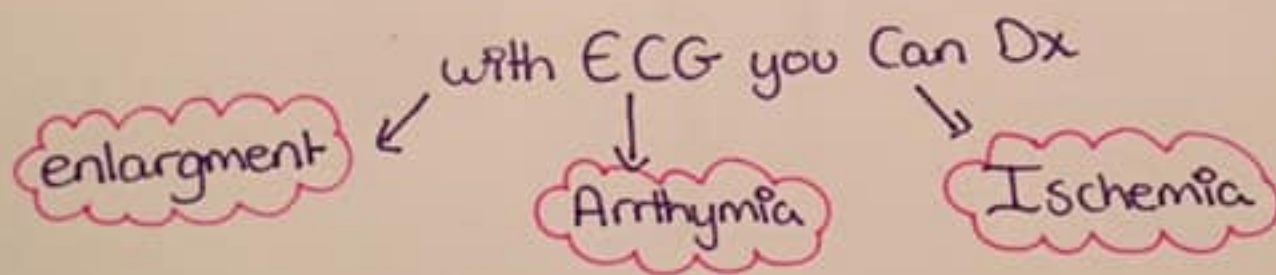
Steps of ECG Interpretation



- 1 = This is an 12 lead ECG paper
- 2 = Name - age - date
- 3 = Speed & Calibration
- 4 = machine put on right "AUR -ve"
- 5 = Sinus or asinus → see P wave in lead II if not clear at V_1
"every P wave followed by QRS"
- 6 = Regular or Not "by R-R interval"
- 7 = HR = $300 / \text{num of large sq. b/w R-R}$
- 8 = Axis = normal - Rt - Lt
- 9 = See waves
 P-wave normal or Not at lead II
 P-R interval if prolonged or Not
 QRS → R wave at $V_1 V_2 / V_5 V_6$ if tall or R-R'
 S-T segment elevation or Depression
 T wave inverted or tented

Your Comments

"This is an 12 lead ECG paper, No name or date, well calibrated at speed 25 mm/sec with (sinus-asisus) rythm, HR (regular-irregular) of ... beat/min with () Axis, Showing → Dx



«واصبر لحكم ربك فانك باعيننا» ♥